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REMARKS

Claims 1 - 37, 39, 40, 42 - 47, 49 - 54, 56, 58 - 68 and 70 are pending in the present application. Claims 1, 9, 16, 17, 20 - 25, 27, 29, 30, 32, 36, 37, 39, 42 - 45, 49, 51, 54, 56, 58, 61, 62, and 64 - 68 have been amended. Claims 38, 41, 48, 55, 57 and 69 have been cancelled. Claim 70 has been added. No new matter has been added.

I. THE FIRST NON-ENABLING REJECTION

In paragraphs 1-2 of the Office Action, claims 1 - 21, 32 - 38, and 43 - 57 are rejected under 35 U.S.C. 112, first paragraph. These claims 1, 32 and 37 are rejected based on the fact that the specification does not describe or define the term "amplitude profile". In order to advance the prosecution on the merits, these claims are amended to change the phrase "amplitude profile" to the term --shape--. Support for the term "shape" appears in particular on page 9, lines 19-25. Moreover, it is respectfully submitted that this amendment does not raise new issues or touch the merits of the application since Applicants are merely clarifying the language of the claims to read consistent with the specification. For all these reasons, it is respectfully submitted this amendment to the claims be entered and the non-enabling rejection be reconsidered and withdrawn.

II. THE SECOND NON-ENABLING REJECTION

In paragraph 3 of the Office Action, claims 38, 41, 48, 57 and 69 are rejected under 35 U.S.C. 112, first paragraph. These claims are rejected because the specification makes no mention of the dimensions claimed or cites the criticality of said dimensions. The claims have been cancelled in order to expedite prosecution of the present application on the merits. For all these reasons, it is respectfully submitted the non-enabling rejection be reconsidered and withdrawn.

III. THE AMENDMENTS TO CLAIMS

The claims have been amended to clean up some inconsistencies noticed therein and to more particularly point out and distinctly define that which Applicants consider to be the invention.

For example, claim 1 is amended to make clear that the first and second reflective elements are characterized by first and second <u>reflective</u> filter functions. The language of claim 1 now reads consistently throughout.

Claim 9 is similarly amended regarding the first and second <u>reflective</u> filter functions, as well as to make clear that the functions have a shape as recited in claim 1.

Claims 16-17 and 20-21 are amended to eliminate the term "tunable" since dependent claims 2 or 3, from which they depend, recites the term --first and second optical elements--, not

It is respectfully submitted that these amendments to the claims do not raise new issues or touch the merits of the application and should be entered because they place the application in condition for allowance. In effect, Applicants are merely clarifying the language of the claims to read consistent with other claims as well as the specification.

IV. THE ANTICIPATION REJECTION

In paragraphs 4-5 of the Office Action, claims 1-6, 8-9, 11, 22, 28-30, 32 - 34, 36, 39, 42 - 44, 58 - 62, 67 and 68 are rejected under 35 U.S.C. 102(b) as being anticipated by Li (U.S. Patent 5,841,918).

Claims 1-6, 8-9, 11

The claimed invention provides an optical filter featuring two reflective elements having different grating profile shapes. The grating profile shapes include profiles having, for example, a Guassian, rectangular or ramp profile. The double reflective bounce results in the optical filter having an effective filter function which may be difficult or practically impossible to produce with a single grating, as described in the patent application on page 9, lines 19-25.

In comparison, Li discloses an optical system having a tuning element 18 with a reflection profile shown in Figure 2a, and a tuning element 20 with a transmission profile shown in

Figure 2b. The combined reflection and transmission result in an optical signal having a filter function shown in Figure 2c.[2] It is respectfully submitted that Li does not teach or suggest an optical filter featuring two reflective elements having different grating profile shapes, as claimed herein.

Dependent claims 2-6, 8-9 and 11 depend from claim 1, contain all the limitations therein, and are deemed patentable for the reasons discussed above.

Claims 22, 28-30, 32 - 34, 36, 39, 42-44

Similar to claim 1, claim 22 is amended to recite a tunable optical filter having two reflective elements. The amendments to claim 22 are ment to clarify the claim language. Claim 22 recites a waveguide that includes two reflective elements disposed therein to provide a pair of respective filter functions. In comparison, Li discloses a plurality of optical filters 14, 16 that apparently have only one transmissive or reflective element, each of which having a corresponding filter function (see Figs. 2a, 2b). Li does not teach or suggest an optical filter having an optical waveguide that includes a first and second reflective element, as claimed by Applicants.

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[2] Based on that shown in Li's Figures 2a, 2b, it appears that the reflection profile shown in Figure 2a is the inverse of the transmission profile shown in Figure 2b, and vice versa. If such is the case, then the tuning element 18, 20 would appear to be using gratings having substantially similar reflection profiles.

Moreover, it is respectfully submitted that Li does not teach a dual core waveguide, as claimed.

Dependent claims 28-30, 32 - 34, 36, 39 and 42-44 depend from claim 22, contain all the limitations therein, and are deemed patentable for the reasons discussed above.

Claims 32 - 34, 36

For reasons similar to that discussed above in relation to claims 1, it is respectfully submitted that independent method claim 32 is deemed patentable over that disclosed in Li.

Dependent claims 33-34 and 36 depend from claim 32, contain all the limitations therein, and are deemed patentable for the reasons discussed above.

Claims 58 - 62, 67 and 68

For reasons similar to that discussed above in relation to independent claim 22, it is respectfully submitted that independent claim 58 is deemed patentable over that disclosed in Li. Moreover, Li does not teach that the center wavelengths of the filter functions are substantially aligned, as claimed herein.

Dependent claims 58 - 62, 67 and 68 depend from claim 58, contain all the limitations therein, and are deemed patentable for the reasons discussed above.

V. FIRST OBVIOUSNESS REJECTION

In paragraphs 6-7 of the Office Action, dependent claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Kringlebotn et al. (U.S. Patent 6,097,487). Claim 7 depends on claim 1, contains all the limitations recited therein, and is deemed patentable over Li for the reasons discussed above.

Kringlebotn et al. is cited in relation to a feature recited in claim 7. However, it is respectfully submitted that Kringlebotn et al. does not make up for the deficiency in the teaching of Li in relation to the subject matter of claim 1. In view of this, it is respectfully submitted that claim 7 is patentable for all the reasons discussed herein.

VI. SECOND OBVIOUSNESS REJECTION

In paragraph 8 of the Office Action, dependent claims 10 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Kewitsch et al. (U.S. Patent 6,236,782). Claims 10 and 35 depends on claim 1 and 32, and are deemed patentable over Li for the reasons discussed above.

Kewitsch et al. is cited in relation to a feature recited in claims 10 and 35. However, it is respectfully submitted that Kringlebotn et al. does not make up for the deficiency in the teaching of Li in relation to the subject matter of claims 1 and 32. In view of this, it is respectfully submitted that claims 10 and 35 are patentable for all the reasons discussed herein.

VII. THIRD OBVIOUSNESS REJECTION

In paragraphs 9 and 10 of the Office Action, claims 12 - 18, 23 - 27, 37, 45 - 47, 49 - 51, 53 - 56 and 64 - 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Fernald et al. (U.S. Patent 6,229,827).

Dependent claims 12 - 18, 23 - 27, 37, 45 - 47, 49 - 51, 53-56 and 64 - 66 depend from independent claims 1, 22 and 37, contain all the limitations therein, and are deemed patentable over Li for the reasons discussed above.

Fernald et al. is cited in relation to a feature recited in dependent claims 12 - 18, 23 - 27, 37, 45 - 47, 49 - 51, 53 - 56 and 64 - 66; however, it is respectfully submitted that Fernald et al. does not make up for the deficiency in the teaching of Li in relation to the subject matter of claims 1, 22 and 37. In view of this, it is respectfully submitted that claims 12 - 18, 23 - 27, 37, 45 - 47, 49 - 51, 53 - 56 and 64 - 66 are patentable for all the reasons discussed herein.

For reasons similar to that discussed above in relation to independent claims 1 and 32, it is respectfully submitted that independent claim 37 is deemed patentable over that disclosed in Li, as well as the proposed combination of Li in view of Fernald et al..

VIII. FOURTH OBVIOUSNESS REJECTION

In paragraph 11 of the Office Action, claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Morey et al. (U.S. Patent 5,007,705).

Dependent claim 19 depends from independent claim 1, contains all the limitations therein, and is deemed patentable over Li for the reasons discussed above.

Morey et al. is cited in relation to a feature recited in dependent claim 19; however, it is respectfully submitted that Morey et al. does not make up for the deficiency in the teaching of Li in relation to the subject matter of claim 1. In view of this, it is respectfully submitted that claim 19 is patentable for all the reasons discussed herein.

IX. FIFTH OBVIOUSNESS REJECTION

In paragraph 12 of the Office Action, claims 20-21 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Putnam et al. (U.S. Patent 6,310,990).

Dependent claims 20-21 and 31 depend from independent claims 1 and 22, contain all the limitations therein, and are deemed patentable over Li for the reasons discussed above.

Putnam et al. is cited in relation to a feature recited in dependent claims 20-21 and 31; however, it is respectfully submitted that Putnam et al. does not make up for the deficiency in the teaching of Li in relation to the subject matter of claims

1 and 22. In view of this, it is respectfully submitted that claims 20-21 and 31 are patentable for all the reasons discussed herein.

X. CONCLUSION

Reconsideration and early allowance of the claims is respectfully requested.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

Please amend the claims as follows:

1. (Twice Amended) An optical filter comprising:

a first optical element including a first reflective element for receiving light and reflecting a first wavelength band of the light centered at a first reflection wavelength, the first reflective element characterized by a first reflective filter function; and

a second optical element, optically connected to the first optical element to receive the reflected first wavelength band of the light, including a second reflective element for reflecting a second wavelength band of the light centered at a second reflection wavelength, the second reflective element characterized by a second reflective filter function;

whereby the shape ~~amplitude profile~~ of the first reflective filter function is different than the shape ~~amplitude profile~~ of the second reflective filter function, and the first wavelength band and the second wavelength band overlap spectrally.

9. (Twice Amended) The optical filter of claim 1, wherein one of the first and second reflective filter functions comprises one of a Gaussian, rectangular and ramp shape ~~ramped profile~~.

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16. (Twice Amended) The optical filter of claim 2 further includes a compression device that axially compresses at least one of the first and second ~~tunable~~ optical elements, wherein at least one of the respective first and second reflective elements is disposed along an axial direction of the respective first and second ~~tunable element~~ optical elements .

17. (Once Amended) The optical filter of claim 3 further comprising:

a first compressing device for compressing axially the first ~~tunable~~ element to tune the first reflective element, wherein the first reflective element is written in the longitudinal direction in the first ~~tunable~~ optical element; and

a second compressing device for compressing axially the second ~~tunable~~ optical element to tune the second reflective element, wherein the second reflective element is written in the ~~longitudinal~~ direction in the second ~~tunable~~ optical element.

20. (Once Amended) The optical filter of claim 2 further includes:

a first compressing device for axially compressing at least the first ~~tunable~~ optical element to tune the first reflective element, responsive to a displacement signal, wherein the first reflective element is disposed axially along the first ~~tunable~~ optical element; and

a displacement sensor, responsive to the compression of the first ~~tunable~~ optical element, for providing the displacement signal indicative of the change in the displacement of the first ~~tunable~~ optical element.

21. (Once Amended) The optical filter of claim 20, wherein the displacement sensor includes a capacitance sensor coupled to the first ~~tunable~~ optical element for measuring the change in the capacitance that depends on the change in the displacement of the first ~~tunable~~ optical element.

22. (Twice Amended) A tunable optical filter comprising:

a tunable optical waveguide for receiving light, the optical waveguide comprising:

a first inner core having a first reflective element disposed therein, the first reflective element ~~for~~ receiving the light and reflecting a first wavelength band of the light centered at a first reflection wavelength, the first reflective element characterized by a first reflective filter function; and

a second inner core having a second reflective element disposed therein, the second waveguide being optically connected to the second waveguide ~~first reflective element~~ to receive the reflected first wavelength band of the light, ~~for~~ the second reflective element reflecting a second

wavelength band of the light centered at a second reflection wavelength, the second reflective element characterized by a second reflective filter function;

whereby the first wavelength band and the second wavelength band overlap spectrally.

23. (Twice Amended) The optical filter in claim 22, wherein the first and second reflective elements include a respective Bragg grating ~~tunable optical waveguide includes a cladding having a first and second inner core therein for propagating light, wherein the first reflective element includes a grating disposed along an axial direction in the first inner core, and the second reflective element includes a grating disposed along an axial direction in the second inner core~~.

24. (Twice Amended) The optical filter of claim 22, ~~23,~~ wherein the tunable optical waveguide has an outer transverse dimension of at least 0.3 mm.

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25. (Twice Amended) The optical filter of claim 22, ~~23,~~ further comprising:

an optical directing device optically connected to the first and second inner cores; the optical directing device directing the light to the first reflective element, directing the first wavelength band reflected from the first reflective element to the second reflective element~~, and directing the second wavelength band reflected from the second reflective element to the output port of the optical directing device~~.

27. (Twice Amended) The optical filter in claim 22, ~~23~~ further includes ~~at least~~ a compressing device for axially compressing the tunable optical waveguide to tune the first and second reflective elements.

29. (Once Amended) The optical filter of claim 22, wherein the shape of the first reflective filter function is different than the shape of the second reflective filter function ~~first and second reflective elements have different filter functions~~.

30. (Once Amended) The optical filter of claim 70, ~~22,~~ wherein the first and second reflection wavelengths are offset by a predetermined spacing.

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32. (Twice Amended) A method for ~~selectively filtering an optical wavelength band from~~ filtering an input light; the method comprising:

providing a first optical element including a first reflective element for receiving the input light and reflecting a first wavelength band of the light centered at a first reflection wavelength, the first reflective element characterized by a first reflective filter function;

providing a second optical element, optically connected to the first optical element to receive the reflected first wavelength band of the light, including a second reflective element for reflecting a second wavelength band of light centered at a second reflection wavelength, the second reflective element characterized by a second reflective filter function; whereby the ~~amplitude profile~~ shape of the first reflective filter function is different than the ~~amplitude profile~~ shape of the second reflective filter function~~, and the first wavelength band and the second wavelength band overlap spectrally~~; and

tuning one of the first and second reflective elements to overlap spectrally the first ~~reflection~~ wavelength band and the second ~~reflection~~ wavelength band.

36. (Twice Amended) The method of claim 32, wherein the tuning one of the first and second reflective elements comprises:

offsetting ~~a~~ the first reflection wavelength and ~~a~~ the second reflection wavelength by a predetermined spacing.

37. (Twice Amended) A compression-tuned optical filter comprising:

a first optical waveguide ~~element~~ including a first reflective element for receiving light and reflecting a first wavelength band of the light centered at a first reflection wavelength, the first reflective element characterized by a first reflective filter function; and

a second optical waveguide ~~element~~, optically connected to the first optical waveguide ~~element~~ to receive the reflected first wavelength band of the light, including a second reflective element for reflecting a second wavelength band of the light centered at a second reflection wavelength, the second reflective element characterized by a second reflective filter function; wherein the ~~amplitude profile~~ shape of the first filter reflective function is different than the ~~amplitude profile~~ shape of the second reflective filter function, and the first wavelength band and the second wavelength band overlap spectrally,

wherein the at least one of the first and second optical ~~element~~ waveguides has outer dimensions along

perpendicular axial and transverse directions, a first portion of the at least one of the first and second optical waveguides having an ~~the~~ outer dimension being at least 0.3 mm along said transverse direction, at least a portion of the first portion ~~respective first or second tunable element~~ having a transverse cross-section which is ~~contiguous~~ continuous and comprises a substantially homogeneous material; and the ~~respective~~ at least one of the first ~~or~~ and second optical waveguides ~~reflective element~~ being axially strain compressed so as to change ~~respective~~ the at least one of the first ~~or~~ and second reflection wavelengths ~~wavelength without buckling the respective first or second tunable element in the transverse direction~~.

39. (Once Amended) The optical filter of claim 29, wherein one of the first and second reflective filter functions comprises one of a Gaussian, rectangular and ramp shape ~~ramped profile~~.

42. (Once Amended) The optical filter of claim 29, wherein the ~~amplitude profile~~ shape of the first reflective filter function is different than the ~~amplitude profile~~ shape of the second reflective filter function.

43. (Once Amended) The method of claim 32, further comprising tuning the other one of the first and second reflective elements to overlap spectrally the first ~~reflection~~ wavelength band and the second ~~reflection~~ wavelength band.

44. (Once Amended) The method of claim 32, wherein one of the first and second reflective filter functions comprises one of a Gaussian, rectangular and ramp shape ~~ramped profile~~.

45. (Once Amended) The method of claim 32, wherein at least one of the first and second optical elements ~~have~~ comprises an optical waveguide having an outer cladding and an inner core disposed therein, wherein the at least one of the first and second reflective element comprises a grating disposed in a longitudinal direction of the inner core.

49. (Once Amended) The optical filter of claim 37, wherein both of the first and second optical waveguides ~~elements~~ is tunable to change each of the respective first and second reflection wavelengths.

51. (Once Amended) The optical filter of claim 37, wherein one of the first and second filter functions comprises one of a Gaussian, rectangular and ramp shape ~~ramped profile~~.

54. (Once Amended) The optical filter of claim 37, wherein at least one of the first and second reflective elements includes a Bragg grating ~~optical elements have an outer cladding and an inner core disposed therein, wherein the at least one of the first and second reflective element comprises a grating disposed in a longitudinal direction of the inner core~~.

56. (Once Amended) The optical filter of claim 37 further includes a compression device that axially compresses at least one of the first and second optical waveguides, ~~tunable optical elements,~~ wherein at least one of the respective first and second reflective elements is disposed along an axial direction of the respective first and second tunable ~~element~~ elements.

58. (Once Amended) An optical filter comprising:

a first optical waveguide including a first reflective element for receiving light and reflecting a first wavelength band of the light centered at a first reflection wavelength, the first reflective element characterized by a first reflective filter function; and

a second optical waveguide, optically connected to the first optical waveguide ~~element~~ to receive the reflected first wavelength band of the light, including a second reflective element for reflecting a second wavelength band of the light centered at a second reflection wavelength, the second reflective

element characterized by a second reflective filter function;

whereby the first reflection wavelength and the second reflection wavelength are substantially aligned ~~to reflect a portion of the aligned wavelength bands~~.

61. (Once Amended) The optical filter of claim 58, further comprising:

an optical directing device optically coupled to the first and second optical waveguides; the optical directing device directing the light to the first reflective element, directing the first wavelength band reflected from the first reflective element to the second reflective element~~, and directing the second wavelength band reflected from the second reflective element to the output port of the optical directing device~~.

62. (Once Amended) The optical filter of claim 58, wherein one of the first and second reflective filter functions comprises one of a Gaussian, rectangular and ramp shape ~~ramped profile~~.

64. (Once Amended) The optical filter of claim 58, wherein at least one of the first and second reflective elements includes a Bragg grating ~~optical waveguides have an outer cladding and an inner core disposed therein, wherein the at least one of the first and second reflective element comprises a grating disposed in a longitudinal direction of the inner core~~.

65. (Once Amended) The optical filter of claim 64, wherein a portion of the at least one of the first and second optical waveguides has an outer transverse dimension of at least 0.3 mm.

67. (Once Amended) The optical filter of claim 59 further includes a compression device that axially compresses at least one of the first and second tunable optical waveguides, wherein at least one of the respective first and second reflective elements is disposed along an axial direction of the respective first and second optical waveguides ~~tunable element~~.

68. (Once Amended) The optical filter of claim 58, wherein the shape of the first reflective filter function is different than the shape of the second reflective filter function ~~the first and second reflective waveguides have different filter functions~~.